

AMENDMENTS TO THE DRAWINGS:

The attached five sheets of drawings (FIGS. 1-8) replace the original five sheets of drawings including Figures 1-8.

Figures 1-8 are amended to schematically show a substrate 1 beneath the insulating film 10.

Attachment: 5 Replacement Sheets

REMARKS

The application has been amended to form and is believed to be in condition for allowance.

Applicants acknowledge with appreciation that claims 27-29 are allowed.

The Figures have been amended responsive to the Official Actions' objection under 37 CFR 1.83(a). Figures 1-8 are amended to schematically show a substrate 1 beneath the insulating film 10. No new matter is entered by way of this amendment.

Claims 1, 2, 20, 21, 28, and 29 have been amended to correct typographical errors and responsive to the Official Action to more clearly recite the elements of the invention. The amendments are non-substantive, being only formal in nature. Accordingly, entry of this amendment is respectfully solicited.

The Official Action rejected claim 2 under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Official Action states that it is unclear where the "barrier metal layer", recited in line 10, is located, and therefore there is insufficient antecedent basis for this limitation in the claim.

Claim 2 was amended to address the section 112, second paragraph rejection.

There are no other formal matters outstanding.

Claims 1, 3, 5, 7, 9 and 20 were rejected as anticipated by HAASE 2003/0211724.

Claims 2, 4, 6, 8, 10 and 21 were rejected as obvious over HAASE.

Applicant respectfully submits that the claimed invention is both novel and non-obvious.

As to claim 1, the Official Action states that HAASE discloses a semiconductor device comprising, referring to Figures 1 and 2, a connection plug 40 defined by a via hole filled with a metal 34b and comprising a nanomaterial 32, 48 surrounded by the metal, wherein the nanomaterial is substantially uniformly disposed in a section of the via hole, and the metal both surrounds the nanomaterial and filled the via hole [paragraph 0021].

It is respectfully submitted that HAASE does not describe or suggest a metal at element 34b that fills a via hole, as recited in claim 1 as amended. HAASE discloses that element 34b is not a metal. Paragraph 0021 clearly states "barrier material 34b may include tantalum nitride or any other material suitable for substantially preventing seepage of conductive material 34a into dielectric 26, according to particular needs."

Tantalum nitride is not a metal, nor would some other metallic material be suitable for the disclosed purpose of substantially preventing seepage of conductive material 34a into

the adjacent dielectric layer 26, which forms the walls of the via 24 (see Fig. 1). From the disclosed HAASE design, element 34b needs to be non-conductive, i.e. non-metallic, in order maintain separation from 34a and 26, which otherwise "may cause short circuits and other problems," (paragraph 0021). If element 34b were a metal, elements 34a and 24 would short out, rendering the device inoperative or "other problems" as disclosed by the reference.

Accordingly, it is respectfully submitted that element 34b is not metallic, and metallic layer 34a, as shown in the Figures, is separated from the via hole by barrier material 34b.

Therefore, it follows that HAASE does not disclose a via hole wherein a metal both surrounds the nanomaterial and fills the via hole, as recited by claim 1. Accordingly, it is respectfully submitted that claim 1 is patentable. It is respectfully requested that the anticipation rejection of claim 1, and claims depending therefrom, be withdrawn.

As to claim 2, the Official Action states HAASE (Figs. 1 and 2) discloses a semiconductor device comprising an interconnection 40 comprising a metal layer filling 34b on the trench. The Official Action states that HAASE does not specify the metal layer 30 is a barrier metal layer, but it would have been obvious to one of ordinary skill in the art at the time the invention was made for the metal layer 30 of HAASE to be a barrier metal layer.

In response, it is noted that claim 2 has been amended to more clearly recite the invention. It is respectfully submitted that HAASE fails to disclose a metal layer filling the trench, as recited in amended claim 2.

As outlined above regarding claim 1, the Figures and specification of HAASE indicate a metallic layer 34a spaced from via hole 24 by non-metallic barrier layer 34b. Accordingly, it is respectfully submitted that the references cited in the Official Action, either individually or in combination, do not disclose all the elements recited by claim 2. Therefore, it is respectfully submitted that claim 2 is non-obvious in view of HAASE.

Reconsideration and allowance of claim 2, and claims depending therefore, are respectfully requested.

The Official Action states that claims 20 and 21 recite product by process limitations and therefore are not given patentable weight over the cited reference.

In response, it is submitted that claims 20 and 21 have been amended, for clarity and form, to recite a structural feature of the invention and are believed to be in patentable condition.

Reconsideration and allowance are respectfully requested.

From the foregoing, it will be apparent that applicant has fully responded to the August 9, 2007 Official Action and

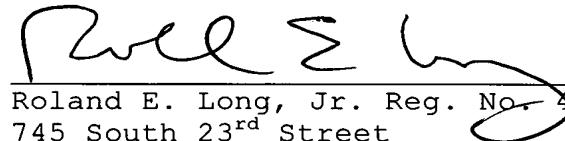
that the claims as presented are patentable. In view of this, applicant respectfully requests reconsideration of the rejected claims, as presented, and their early passage to issue.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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APPENDIX:

The Appendix includes the following item(s):

- five Replacement Sheets